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AUTHOR(S):

Toda, Kazuya; Ryu, Heungjin; Hayashi, Misato; Furuichi, Takeshi

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CITATION:

Toda, Kazuya ...[et al]. <Note> An Infant Bonobo Mimicked a Handicapped Motor Action of a Disabled Individual at Wamba in the Luo Scientific Reserve, Democratic Republic of Congo. Pan Africa News 2016, 23(1): 3-5

ISSUE DATE:

2016-06

URL:

<http://hdl.handle.net/2433/216109>

RIGHT:

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## &lt;NOTE&gt;

## An Infant Bonobo Mimicked a Handicapped Motor Action of a Disabled Individual at Wamba in the Luo Scientific Reserve, Democratic Republic of Congo

Kazuya Toda, Heungjin Ryu, Misato Hayashi & Takeshi Furuichi

Primate Research Institute, Kyoto University, Japan  
(E-mail: toda.kazuya.78x@st.kyoto-u.ac.jp)

## INTRODUCTION

Imitative abilities to copy the behaviors of others are important for humans to acquire novel skills (Tomasello *et al.* 1993). Scientific research has focused on whether non-human primates have these abilities, and experimental imitation studies in our nearest primates have been carried out (reviewed by Whiten 2015). Based on cognitive experiments of captive great apes, their learning processes were classified as “emulation” to reproduce desirable results of the actions of others, rather than “imitations” to reproduce the behavior itself (Whiten *et al.* 2004). Another experimental evidences indicated that chimpanzees imitate others' actions, whereas they are less sensitive to body movements than to manipulated objects involved in the demonstrated actions (Myowa-Yamakoshi & Matsuzawa 1999). However, it remained unclear whether great apes can learn to reproduce novel motor actions by bodily matching.

“Do-as-I-do” experiments of chimpanzees provided positive evidence that they can copy the form of human actions through a battery of training actions (Custance *et al.* 1995). Moreover, Fuhrmann *et al.* (2014) provided the first quantitative evidence for motor copying with synchrony between the movements of the observers and models in chimpanzees and orangutans. This learning behavior was referred to as “mimicking” rather than imitation in that copying motor actions did not have a physical goal to reproduce desirable results of the models' actions.

Nevertheless, these experiments showed that great apes have the capacity to learn novel and simple motor actions by bodily matching.

Observations of social learning in great apes under natural conditions are valuable, because experience of cognitive experiments in captivity can affect and enhance the enculturated skills of these apes (Hirata *et al.* 2009). At Bossou in Guinea, infant chimpanzees acquired stone-nut manipulation through close observations of skilled manipulation by adult individuals (Inoue-Nakamura & Matsuzawa 1997). Hobaiter and Byrne (2010) reported that young chimpanzees copied a motor procedure with a liana-scratch technique from a disabled chimpanzee at the Budongo Forest Reserve in Uganda. However, no reports exist of motor mimicking based on visual information of the body movements of others in wild conditions. We observed an instance of an infant bonobo (*Pan paniscus*) mimicking a handicapped motor action spontaneously from a disabled individual at Wamba. This report could be the first evidence of motor mimicking in wild infant bonobos.

## STUDY SITE &amp; BACKGROUND

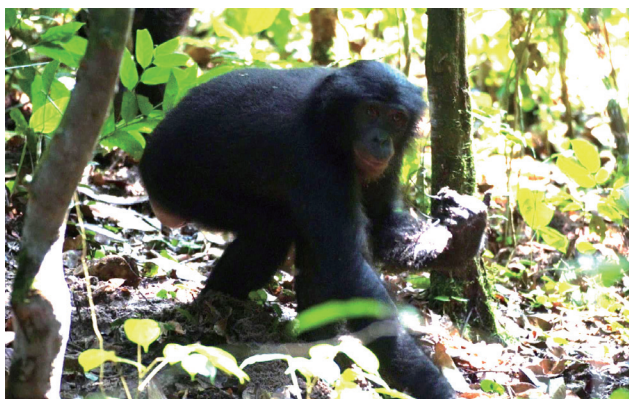
Observational study of bonobo behaviors was carried out at Wamba in the Luo Scientific Reserve, Democratic Republic of Congo. One main study group of bonobos (E1) was habituated fully and the all members were identified. At the time of the present observation, the E1 group consisted of 34 individuals: 8 adult males, 8 adult females, 4 adolescents, 6 juveniles, and 6 infants. Researchers and field assistants followed the largest party daily as far as possible from bed to bed (around 06:00 to 17:00 h), and recorded *ad libitum* behaviors of bonobos.

Snare injuries to wild chimpanzees are serious problems at some study sites (Quiatt *et al.* 2002). Although the use of traditional techniques is allowed at Wamba in the Luo Scientific Reserve, the use of metallic snares is prohibited to protect primates (Furuichi *et al.* 2012). However, Wamba bonobos are sometimes caught and injured by metallic snares.

An adolescent female (Pf) immigrated into the E1 group from the western adjacent group in October 15,



**Figure 1. Adult females rescuing Pf from a metallic snare? Adult females surrounded Pf to peer at her hand ensnared by the metallic snare. One female was pulling the metallic snare in this picture taken by TF.**



**Figure 2.** Pf's handicapped motor action. Pf were digging truffles in swamp forest with the handicapped motor action in this picture taken by RH. She had behaved without the use of her left hand ensnared by the metallic snare.

2013. Unfortunately, Pf was caught in a metallic spring-type snare made from an iron wire attached to an arched branch on July 22, 2014, when KT and TF followed a party of the E1 group. A field assistant used a machete to release Pf from the snare, after which Pf quickly climbed up the trees with the rest of the snare still attached. The following morning, some adult females and offspring peered at her ensnared hand and tried to pull and bite the snare (Figure 1). Although one female successfully removed the branch portion, the iron wire had ensnared the fingers. Since then, Pf had had a handicapped motor action, without the use of the left hand, so as to hold the fingers to the inside of the wrist (Figure 2, also see Video 1 available online at [http://mahale.main.jp/PAN/23\\_1/23\(1\)\\_02.html](http://mahale.main.jp/PAN/23_1/23(1)_02.html)).

## OBSERVATION

On the morning of November 29, 2014, an infant male (SE) 2 years and 11 months old seemed to adopt a behavior similar to the handicapped motor action of Pf in two scenes, observed by KT and HR, who were following a party of the E1 group at a sleeping site from 05:31 h onwards. The party consisted of 10 individuals, including Pf and SE. We observed that SE walked and played without the use of his left hand from 08:12 h to 09:27 h, when most individuals had begun to take part in grooming in the group (Figure 3; also see Video 2 available online [http://mahale.main.jp/PAN/23\\_1/23\(1\)\\_02.html](http://mahale.main.jp/PAN/23_1/23(1)_02.html)).



**Figure 3.** SE's motor mimicking. SE were walking without the use of his left hand in this picture taken by RH. He behaved like Pf as to hold the fingers to the inside of the wrist.

In a scene from Video 2, he hanged the left hand powerlessly and held the left fingers to the inside of the wrist, while poking another individual in the face, walking on a fallen tree, and peering into grooming individuals. This unusual behavior by SE had been observed previously neither before nor after Pf's capture in the metallic snare. We could not confirm any external injuries to the finger of SE's hand. We did not observe this behavior in SE after this grooming session, when the party fed on grounds and in high trees.

The party being followed by researchers moved in the direction of the voices of another party at 11:58 h, and they fused into this party, which consisted of 17 individuals at 12:08 h. From 12:11 h to 12:45 h, most adults rested and four offspring played socially, engaging in behaviors such as wrestling and chasing. The social plays involved active motions on the ground and in low trees, such as kicking on others' backs, butting each other with play pants, and trying to grab legs or trunk of others hanging from branches with their arms. SE again showed successively the handicapped motor action during the period of social plays. SE occasionally used his left hand to grab others' body and walk on trees: therefore, he did not seem to have a physical problem using this hand. The party then moved on and fed on piths on the grounds. We did not observe this unusual motor action again.

## DISCUSSION

We observed that SE seemed to pretend not being able to use his able left hand. His behavior may be considered a "handicap play" similar to a report of a captive bonobo who covered her eyes with her hands until she lost her balance (de Waal 1995). In the present case, SE's handicap play was likely to stem from the Pf's handicapped motor actions. He seemed to acquire the similar motor action from visual information of her body movements. The physical copying of a non-functional motor act can be considered motor mimicking. This report may provide evidence that bonobos can reproduce the form of novel motor actions by spontaneous bodily matching in the wild.

Field studies of Bossou chimpanzees have suggested a critical period ranging from 3 to 5 years old to learn nut-cracking (Biro *et al.* 2003). Also, the field study of Budongo Forest Reserve reported that younger chimpanzees at 4–13 years old acquired the liana-scratch technique (Hobaiter & Byrne 2010). This motor mimicking case by an infant bonobo is consistent with these studies in that immature individuals tend to reproduce others' behavior from the visual information. Further study is needed to explore how this playful mimicking is widespread among immature great apes and related to the development of their social learning skills.

## ACKNOWLEDGMENTS

We sincerely thank the Research Center for Ecology and Forestry and Ministry of Scientific Research, DRC for helping our field research. We are also grateful to field assistants and others at Wamba for their support during our study. This research was financially supported by the Leading Graduate Program in Primatology and Wildlife Science of Kyoto University, and Grant in Aid for Scientific Research to TF and



Asia-Africa Science Platform Program to TF from the Japan Society for the Promotion of Science.

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and those contributions to the scientific community are recognized worldwide (Nishida 2012; Nakamura *et al.* 2015). The pivotal team involved in these studies, now called the Mahale Mountains Chimpanzee Research Project (MMCRP), organizes researchers studying chimpanzees and other wildlife at Mahale. MMCRP obligates its researchers to contribute to the activities of the Mahale Wildlife Conservation Society (MWCS), which was established in 1994 (Nishida & Nakamura 2008; Hosaka & Nakamura 2015). One of the aims of MWCS is to raise public awareness of the importance of wildlife research and conservation at Mahale, because researchers' work is supported by public and private funding. Despite their long history of achievements, researchers have faced the reality that their efforts are little known to the public, even in Japan, which is self-evident when their renown is compared with the fame of another long-term wild chimpanzee research at Gombe National Park, Tanzania.

In 2015, a rare outreach event commemorating the 50th anniversary of chimpanzee research at Mahale was conducted in Tokyo. Through various channels, e.g., the distribution of flyers and posters; announcements in MWCS newsletters; coverage in Japan's two largest newspapers; pre-events at Tama Zoological Park; and notices on the websites of MWCS, the World Wildlife Fund (WWF), and Tokyo Zoological Park Society; the executive committee issued a call to the general public to encourage their participation in the event. Active researchers prepared poster exhibitions featuring 21 topics relating to research and conservation at Mahale, while in the symposium young and old researchers, ranging in age from twenties to seventies, gave talks about history, ongoing studies, and the future of Mahale (Hosaka 2015). This report aims to investigate the reactions of general participants in the event in order to obtain some useful information concerning wildlife research projects' planned public outreach programs.

## METHODS

A questionnaire survey was conducted at the University of Tokyo's Yayoi Auditorium Ichijo Hall on September 19, 2015 where the Mahale 50 Exhibition and Symposium was held. At the reception, questionnaire sheets were distributed to 320 participants. After the symposium, in order to assure voluntary submission, the participants were asked to post completed sheets into a collection box.

This survey was approved by the Research Ethics Committee of Kamakura Women's University (#15109).

### Questionnaire

The sheet contained informed consent, 16 questions concerning respondents' attributes, and comments about the event. The respondents were asked to write answers (q1–2, 16), select from multiple choices (q3–5, 15), and to rank questions on a six-point scale: “1” (strongly disagree) to “6” (strongly agree) (q6–14).

(q1) Sex

(q2) Prefecture

(q3) Age class (10's, 20's, 30's, 40's, 50's, 60's, 70 or over)

(q4) Occupation (office worker, student, homemaker, self-

## <NOTE>

### How was the Mahale 50 Exhibition and Symposium Assessed by the General Participants? A Questionnaire Survey

Sana Inoue<sup>1</sup> & Kazuhiko Hosaka<sup>2</sup>

<sup>1</sup> Konan Women's University, Japan

<sup>2</sup> Kamakura Women's University, Japan

(E-mail: inouesan@konan-wu.ac.jp)

## INTRODUCTION

The year 2015 marked the 50th anniversary of wild chimpanzee studies at Mahale Mountains National Park, Tanzania. During this half-century, a number of scientific findings have been published by no less than 80 researchers from Japan, North America, Europe, and Tanzania,